Center Independent Research & Development: GSFC IRAD

ATLAST: Optical Systems Engineering & Development

Completed Technology Project (2014 - 2016)

Project Introduction

The selection of the Advanced Technology Large Aperture Space Telescope (ATLAST) by the NRC Decadal Survey as the highest-priority space mission for the 2020s will result in a new flagship mission for NASA. Investing now in a few strategic engineering activities will improve the fidelity of the ATLAST reference mission concept, as well as continue the development of key technologies to TRL-5 by 2020.

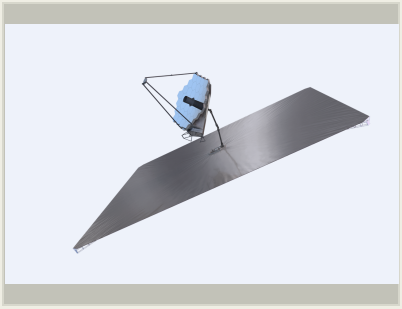
The ***objective of the proposed effort*** is to complete several optical systems engineering activities in support of the ATLAST reference mission concept study. Continued progress on these tasks contributes to the ***long-term goal*** of the ATLAST study: selection by the NRC Decadal Survey as the highest-priority space mission for the 2020s.

Specific tasks include:

- Build contrast and wavefront error budgets in the context of coronagraphic imaging and spectroscopy. These budgets will help quantify numerous requirements that will be levied on the observatory structural-thermal-optical systems, as well as help trade coronagraph instrument concepts based on their impact on the overall observatory requirements.
- Build an end-to-end coronagraphic image simulator that captures all relevant effects, including: extra-solar dust and planetary models; segmented aperture diffraction; wavefront error static and dynamic contributions; coronagraphic instrument performance; detector and photon noise, etc.
- Support ongoing jitter/disturbance analysis of the primary and secondary mirror systems to determine performance requirements for an observatory disturbance isolation system. This task has the added benefit of continuing to refine and improve the fidelity of the optical and structural/mechanical models of the primary and secondary mirror systems.
- Flesh out optical models and packaging designs for a notional initial instrument suite.

Anticipated Benefits

Advanced Technology Large Aperture Space Telescope (ATLAST)



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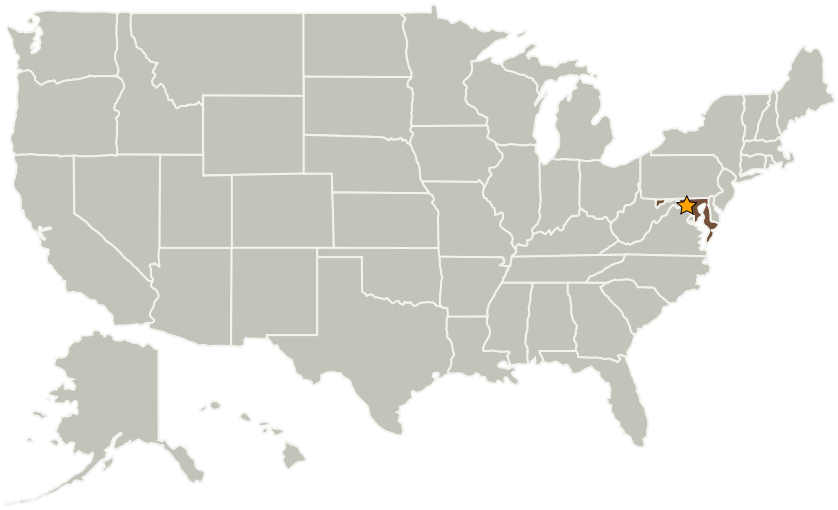
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Manager:

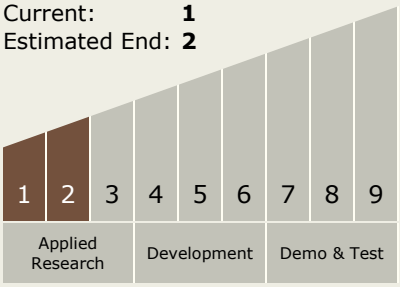
Terence A Doiron

Principal Investigator:

Matthew R Bolcar

Technology Maturity (TRL)

Start: **1**
Current: **1**
Estimated End: **2**



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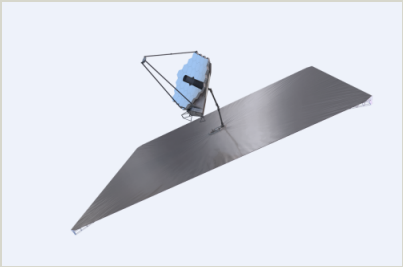
Images



ATLAST
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(https://techport.nasa.gov/image/16262)

Project Website:

http://sciences.gsfc.nasa.gov/sed/

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.2 Observatories